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ORIGINAL ARTICLE

Respiratory Symptons Prevalence Among Traffic Policemen in Malaysia

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ABSTRACT

Introduction: Traffic policemen are exposed to polluted air for a long time in high concentrations since they are working outside for most of the time which is bad for their health. Hence, this study was to determine the prevalence of respiratory symptoms and pulmonary function among traffic police in Kuala Lumpur and Johor Bahru. **Methods:** A pulmonary function test using spirometer was used to measure the pulmonary function of subjects. A questionnaire on respiratory symptoms translated version from IUALTD was used. The questionnaire includes background data, occupational and health history. **Results:** The traffic policemen were determined as having lower lung function parameters; low FVC% predicted (89.6%) and low FEV1% predicted (94%) due to their nature of work and the environment. Coughing was present at the highest (33.6%) among them, whereas wheezing was found the least (15.7%) of the workers. **Conclusions:** Findings from this study, indicated that there is a development of respiratory diseases and deterioration of lung function among traffic policemen. These baseline data can serve as a reference to the top management of traffic police officers in order to develop an occupational safety and health guideline for police officers as they are not covered by Occupational Safety and Health Act (OSHA, Act 514 1994).

Keywords: Occupational health, Air pollution, Respiration disorders, Police, Respiratory function tests

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INTRODUCTION

Policemen especially traffic police usually live under constant apprehension of physical danger, work long and irregular hours, and are exposed to unpleasant sides of life which eventually results in psychological stress, family & personality problems (1). They have also involved in some accidents such as vehicle crashes, falls during rescue, chase and similar operations. Moreover, they are exposed to a number of hazards during their working time such as particulates exposure to outdoor air and noise. These policemen were to carry out their duties regardless of the risk they are facing such as bad motorcycles condition (use in patrolling) and even in worst weather condition. Thereupon, they are prone to develop health problems on the grounds they are spending much time outdoors, including under the sun or in bad weather. For instance, they may develop lung cancer, Chronic Obstructive Pulmonary Disorder (COPD), hearing problems and many more. Besides, as policemen, they were to help the public in need regardless of the situation, such as unavoidable contacts with people who have contagious diseases (2).

Under the Police Act, 1967 Section 21 task of regulating, controlling and maintaining the flow of traffic on public roads falls to the responsibilities of a traffic policeman (3). With such responsibilities, they have no choice other than to perform the given task. Their task is considered heavy duty as they had to deal with congested traffic condition and attitude of selfish drivers. Thus, if coupled with the polluted air, their health will worsen due to occupational factors. As evidence, Jafary et. al stated that traffic-related air pollution is an occupational health hazard to individuals who perform physical labour close to traffic (4). Ambient air pollutions are derived mainly from fuel combustion. They include primary pollutants (sulfur dioxide, nitrogen oxides, and particles), secondary acidic aerosols and other particles, and oxidant pollutants (primarily ozone) that are produced by photochemical reactions involving hydrocarbons and nitrogen oxides (5).

In Malaysia, there are three major sources of air pollution namely mobile sources, stationary sources and mobile sources. Emissions from mobile sources have been the main source of air pollution, contributing at least 65-75% of total air pollution for the past years (6). As proclaimed by an annual report by DOS (Department

of Statistics, Malaysia) (7) in Fig. 1, air pollution level in Malaysia is on an unhealthy level which everyone may begin to experience health effects whereas members of sensitive groups may develop serious health effects. This is supported by the (8) Air Quality and Pollution Measurement by US EPA in Table I.

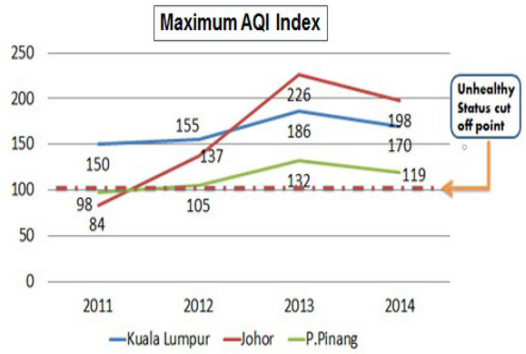

Figure 1: Annual Maximum Air Pollutant Index for Selected Stations (Source: Department of Statistics, 2015)

Table I: Air Quality and Pollution Measurement (Source: aqicn.org/city/kuala-lumpur/)

AQI	AIR POLLUTION LEVEL	HEALTH IMPLICATIONS
0-50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk.
51-100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
101-150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.
300+	Hazardous	Health alert: everyone may experience more serious health effects

It has been reported in a few previous studies that the exposure to traffic air pollutant significantly affecting their lung function, where the lung function tests were conducted among the traffic police. A study in India found that the more exposed group had significantly reduced lung function than a less exposed group with $p < 0.001$ (8,9,10). As reported above, the vehicular emissions are one of the main contributors to air pollution. Hence, based on these data, we can conclude that the traffic policemen who perform labour close to traffic are working in an environment that is unfavourable for their health. They are also facing hazards which physically and psychosocially affect their health. Therefore, working in such environments has made them prone to getting respiratory health problems.

However, there are limited studies in Malaysia regarding pulmonary functions parameters and respiratory symptoms among traffic policemen. In response to this problem, this study proposes to investigate possible respiratory symptoms and prevalence of pulmonary functions in traffic policeman who work in heavy traffic areas in KL and JB.

MATERIALS AND METHODS

This is a cross-sectional study measures the status of lung function among traffic policemen and their respiratory symptoms. As advised by Bukit Aman Headquarters, the study location was chosen, using purposive sampling. In order to have a bigger collection of data, a few police stations were involved. This study was conducted in Traffic Police Station in Kuala Lumpur (Balai Trafik Jalan Tun H.S. Lee) and Johor (Balai Trafik Johor Bahru).

KL and Johor Bahru had similar situations regarding their traffic volume, the research is done in these states due to this fact. By looking at the air pollution index in 2014, both locations were in unhealthy status which was 170 for Kuala Lumpur and 198 for Johor Bahru. The status is overwhelming for both states whereby everyone may begin to experience health effects with members of sensitive groups may experience more serious health effects. Moreover, the number of traffic police riders in KL and Johor was the largest in Malaysia (Royal Malaysian Police, 2014c). The study framework was obtained from a list of the entire traffic policeman in the respective police stations. The name list was obtained from the administration office of each police station. However, the traffic policemen that were included in this study were taken from Point Duty department only where they spent more than 8 hours (Morning shift: 0600 hours to 1500 hours, evening shift: 1400 hours to 2300 hours) working outside. According to Royal Malaysian Police (2010c), this is due to their nature of work which mainly involving outdoor activities. Traffic police in this department especially have been exposed to polluted air more frequently as their duties adjure them to control road traffic at the highly congested junctions. A total of 157 respondents was involved. The respondents are those without history of smoking, cardiovascular and acute or chronic respiratory disease. SpirolabII was used to measure the lung function status of the respondents. The procedures are as follows:

a) After taking a detailed history and anthropometric data, the workers were informed about the whole manoeuvre. The workers were encouraged to practice this manoeuvre before performing the pulmonary function test. The test was performed with the subject in standing position without using a

nose clip.

b) The test was repeated three times after adequate rest and results were obtained in the spirometer. The measured parameters were; i) forced vital capacity (FVC), ii) forced expiratory volume in one second (FEV1), iii) forced expiratory ratio (FEV1/FVC %).

Background information and major respiratory symptoms experienced by respondents were obtained by using questionnaire. The questionnaire was adopted from a study by Putri (10) which are based on IUALTD (1986).

RESULTS

Among all the traffic policemen in this unit, there were workers with low FVC% predicted (89.6%) as well as workers with low FEV1% predicted (94%) as shown in Table II. The distribution of workers with respiratory symptoms was as shown in Table III. Generally, a lung function test was defined as abnormal if it was less than 80% or greater than 120% of predicted, with notable exceptions for FEV1/FVC (less than 70% observed) using the per cent predicted method. Coughing was present the highest (33.6%) among them, whereas wheezing was found the least (15.7%) of the workers. Phlegm and shortness of breath were having 31.3% and 32.1% respectively.

Table II: Distribution of lung function status

Variables	Status	Study Locations Frequencies (%)		Total N=134 Frequencies (%)	χ2 value	p - value
		KL n=70	JB n=64			
FVC% predicted	Abnormal	61(87.1)	61(95.3)	122(91.0)	2.74	0.10
	Normal	9(12.9)	3(4.7)	12(9.0)		
FEV1% predicted	Abnormal	65(92.9)	61(95.3)	126(94.0)	0.36	0.55
	Normal	5(7.1)	3(4.7)	8(6.0)		

*Chi square test

DISCUSSION

Based on Table II, the lung function test results show that more than 50% of traffic policemen in both study locations are abnormal. This is an alarming situation. By looking at the table, when the FVC% predicted and FEV1% predicted were further tested for confounding, there is no significant difference detected. These results show that the study locations were not a confounder for lung function in this study. The test is carried out because two different locations were involved in this study. In order to prove they are not a confounding factor in this study, a chi-square test is done. Hence, at the time of data collection for this study, the study locations are not a confounder. Since ambient air varies according to time and place, this factor is taken care of. The air quality for both locations noted, and it shows that the air quality is similar to each other as stated before in Materials & Methods.

Overall, this results can prove that their pulmonary health is not as good as a healthy person. In-depth research on the factors that cause this to happen need to be thoroughly studied. This is agreed by the similar previous study by Muhammad A.S. et al. (11) in Kuala Lumpur which also found that there were significant reductions in all lung function parameters among exposed groups of traffic policemen compared to general policemen. This is agreed by a study among traffic policemen in Solapor carried out by Haralkar and Gite (12) which found that the FEV1 was significantly lower in respondents who exposed to the more polluted working area compared to another less polluted working area. As compared to previous studies, the abnormal pulmonary function tests observed were mainly restrictive changes, however, there are few cases had combined obstructive and restrictive impairment (13,14). A worker with an obstructive pattern of impairment occurs as a result of damage to the small airways or bronchioles, resulting

Table III Distribution of respiratory symptoms among respondents

Variables	Study Locations Frequency (%)		Total Frequency (%) N=134	χ2 (df)	p - value
	KL n=70	JB n=64			
Coughing					
Yes	25(35.7)	20(31.3)	45(33.6)	0.30	0.59
No	45(64.3)	44(68.8)	89(66.4)		
Phlegm					
Yes	18 (25.7)	16(25)	34(25.4)	0.01	0.92
No	52(74.3)	48(75)	100(74.6)		
Wheezing					
Yes	13(18.6)	7(10.9)	20(14.9)	1.53	0.22
No	57(81.4)	57(89.1)	114(85.1)		
Shortness of breath					
Yes	26(37.1)	17(26.6)	43(32.1)	1.72	0.19
No	44(62.9)	47(73.4)	91(67.9)		

*Chi square

in a decreased ability to exhale air. A worker with a restrictive pattern of impairment describes a condition in which there is a reduction in the volume of air that can be taken in and then pushed out of the lungs (a breath). It is possible for both patterns of impairment to occur at the same time. Pre-existing conditions, such as asthma, chronic bronchitis and allergies can aggravate the situation. These are explained in an article by Subbarao, Mandhane, and Sears (15). Also, in this study, noticed a trend of respiratory symptoms such as coughing, wheezing, phlegm and shortness of breath. As shown in Table III, the majority of the respondents were having coughing and shortness of breath symptoms. This might be due to their nature of work which some of the workers in varies traffic junctions which may expose to different concentration of fine particulates or PM2.5. This reinforces the assumption that they are facing serious lung health problems which are left to be worse. Compared to the previous study by Muhammad et. al. (11), distribution of respiratory symptoms is much higher in this present study. This is in harmonizing with a study by Halvani and colleagues (16) showed that respiratory complaints in the study group are high. However, more deep studies should be done to understand more on the respiratory status of traffic policemen.

Limitations in this study as it only studies selected areas in Malaysia and not every part of it. This is due to time and budget constraints while conducting this study. Exposure to air pollutants related to this study is discussed in another paper by the same author. Other than that, the sample size is not fulfilled due to dropping out of the respondents. Nevertheless, from the sample size, 85% of it was fulfilled.

CONCLUSIONS

Majority of respondents recorded abnormal lung function status (FVC,91% and FEV1, 94%). Respondents had relatively high respiratory symptoms (Coughing 33.6%, Phlegm 25.4%, Wheezing 14.9% and 32.1%) reported in this study compared to a similar previous study. To conclude, traffic policemen were mainly exposed to physical hazards which is traffic pollutant emitted by vehicles which resulting in their poor lung health and soon will be a serious problem if no further action to be taken.

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